



TENNESSEE DEPARTMENT OF

EDUCATION
FIRST TO THE TOP

Green Architecture (PLTW)

Primary Career Cluster:	Science, Technology, Engineering, and Mathematics (STEM)
Consultant:	Bethany King Wilkes, (615) 532-2844, Bethany.Wilkes@tn.gov
Course Code:	TBD
Prerequisite(s):	None
Credit:	N/A
Grade Level:	8
Graduation Requirement:	N/A
Coursework and Sequence:	This is the first course in the <i>Project Lead the Way (PLTW)</i> middle school sequence of coursework.
Necessary Equipment:	Visit www.pltw.org for more information.
Aligned Student Organization(s):	Technology Student Association (TSA): http://www.tntsa.org Amanda Hodges, (615) 532-6270, Amanda.Hodges@tn.gov
Coordinating Work-Based Learning:	N/A
Available Student Industry Certifications:	N/A
Dual Credit or Dual Enrollment Opportunities:	N/A
Teacher Endorsement(s):	001, 013, 014, 015, 016, 017, 018, 047, 070, 078, 081, 101, 210, 211, 212, 213, 214, 230, 231, 232, 233, 400, 401, 402, 413, 414, 415, 416, 417, 418, 440, 470, 477
Required Teacher Certifications/Training:	<i>Project Lead the Way</i> training is required
Teacher Resources:	http://www.tn.gov/education/cte/doc/STEMResourceList.pdf

Course Description

This is a course in the series of *Project Lead the Way (PLTW)* curriculum. For more information, visit the PLTW website at <http://www.pltw.org/>.

Program of Study Application

These courses build knowledge and skills related to the following career clusters:

- 1) Architecture & Construction
- 2) Information Technology (IT)
- 3) Manufacturing
- 4) Science, Technology, Engineering & Mathematics (STEM)
- 5) Transportation, Distribution, & Logistics

Course Standards

The course standards outlined below are the copyrighted property of *Project Lead the Way*. Teachers must participate in *Project Lead the Way* training in order to be able to teach this course.

Lesson 1 – Architectural Basics (16 days)

Understandings

- 1) The ability to measure accurately is important at school and at home, at work, and when pursuing hobbies.
- 2) Precision measuring tools are needed for accuracy, but tools must be used correctly to ensure that accurate measurements are taken.
- 3) Quality of workmanship and accurate measurements with precise instruments are necessary to successfully solve problems.
- 4) The use of scale is important in design in order to create a functional space that is proportional and aesthetically pleasing to the client.
- 5) Dimensioning and measuring are required for any architectural project as well as many careers in related fields.
- 6) Area and perimeter are used to find the square footage of a floor, a wall, or the length and width needed to build the exterior of a home.
- 7) When designing a home, standard rules must be followed in regards to traffic flow, room sizes and relationships, and the layout of kitchens and bathrooms.
- 8) A set of architectural plans includes: plot plan, foundation plan, floor plan, elevations, 3-D views, and construction details.

Knowledge and Skills

It is expected that students will:

- Demonstrate the proper use of a standard ruler and an architectural scale.
- Use proper notation in regards to dimensioning an architectural drawing. Calculate area and perimeter of a floor plan given dimensions.
- Measure a room and draw it to scale using common symbols.
- Identify the systems required in a residential home, including electrical, plumbing, heating, ventilation, and air conditioning.
- Describe the three areas of a house and the rooms that belong to them.
- Identify common roof styles.
- Describe the working triangle and its purpose.
- Identify and use appropriate symbols in a basic floor plan for a residential home.
- Read and interpret a blueprint of a floor plan.



Lesson 2 – Introduction to Sustainable Architecture (12 days)

Understandings

- 1) Sustainable building solutions are an important part of the world today as our resources are dwindling.
- 2) Many different processes are used to recycle a variety of materials.
- 3) Researching the various recycling processes helps one better understand the requirements and the complexity of recycling processes.
- 4) The air we breathe inside a room can contain contaminants and particles, making it potentially dangerous for humans.
- 5) The health consequences of poor indoor air quality include coughs, colds, cancer, and even death.
- 6) Building green refers to methods of fabricating both commercial and residential structures to reduce their impact on human health and the natural environment.
- 7) Architectural designs are created based on the needs of humans and function of the building in relationship to the climate, region, and culture.
- 8) Within a local community there can be a variety of construction materials and architectural styles depending on purpose.
- 9) Architects, engineers, designers, and engineering technologists are in high demand for the development of future technology to meet societal needs and wants.

Knowledge and Skills

It is expected that students will:

- Communicate, using a variety of media, the effects that daily living has on the environment.
- Describe the steps of the recycling system.
- List ways to improve indoor air quality.
- Explain the consequences of poor indoor air quality.
- Categorize concepts related to building eco-friendly.
- Identify the local home styles in the region and outside of the region.
- Describe different house styles and how they can be built green.
- Provide examples of STEM careers and the need for these professionals in our society.

Lesson 3 Architectural Challenge (17 days)

Understandings

- 1) The ability to measure precisely and accurately is important at school and at home, at work, and when pursuing hobbies.
- 2) Numerous symbols are part of architectural plans. It is important to be able to identify such symbols.
- 3) Wood frame construction is popular because it is economical and strong.
- 4) Using graph paper and an architectural scale can help in the visualization of a space before the start of the prototype phase.
- 5) Architecture today uses computer-aided design (CAD) systems to quickly generate and annotate working drawings.
- 6) Three-dimensional computer modeling uses descriptive geometry, geometric relationships, and dimensions to communicate an idea or solution to a technological problem.
- 7) Using alternative materials in construction is beneficial to our environment.



- 8) Architecture and construction emphasize using environmentally friendly practices in their career fields.
- 9) Architects and engineers use the design process when designing and building structures.
- 10) Shipping containers stack up as waste unless they are repurposed; they offer many benefits as construction materials that are strong, water proof, pest proof, recycled, easy to build with, etc.
- 11) Creating a functional and environmentally friendly home is considered sustainable housing that could be adapted for emergency shelter in disaster areas.

Knowledge and Skills

It is expected that students will:

- Demonstrate knowledge of measurement, construction, and design.
- Identify the parts of a wall section.
- Measure accurately using a tape measure and architectural scale.
- Read and interpret a blueprint of a floor plan.
- Construct a model of the framing of a wall section.
- Demonstrate use of the Design Process including a Design Brief, Sketching, and Decision Making Matrix.
- Use Autodesk Revit Architecture to create an architectural drawing.
- Design an environmentally friendly home

